

Space News Roundup

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No. 14

Space history began with Russian flight

[Editor's note: Today also is the 35th anniversary of the first launch of a human into space, the Russian Yuri Gagarin. This is a retrospective account of that first milestone in human space flight.]

By Rob Navias

At 9:07 a.m. Moscow time on April 12, 1961, a 27-year old Soviet Air Force lieutenant left the shackles of Earth strapped inside a tiny Vostok capsule to begin humanity's journey away from its home planet.

From a wind-swept desert launch site in Central Asia, Yuri Gagarin began a 90-minute journey that would propel his name into the history books and Russia into the lead in a race with the U.S. for space supremacy which would culminate with Americans planting the first footprints on the Moon eight years later.

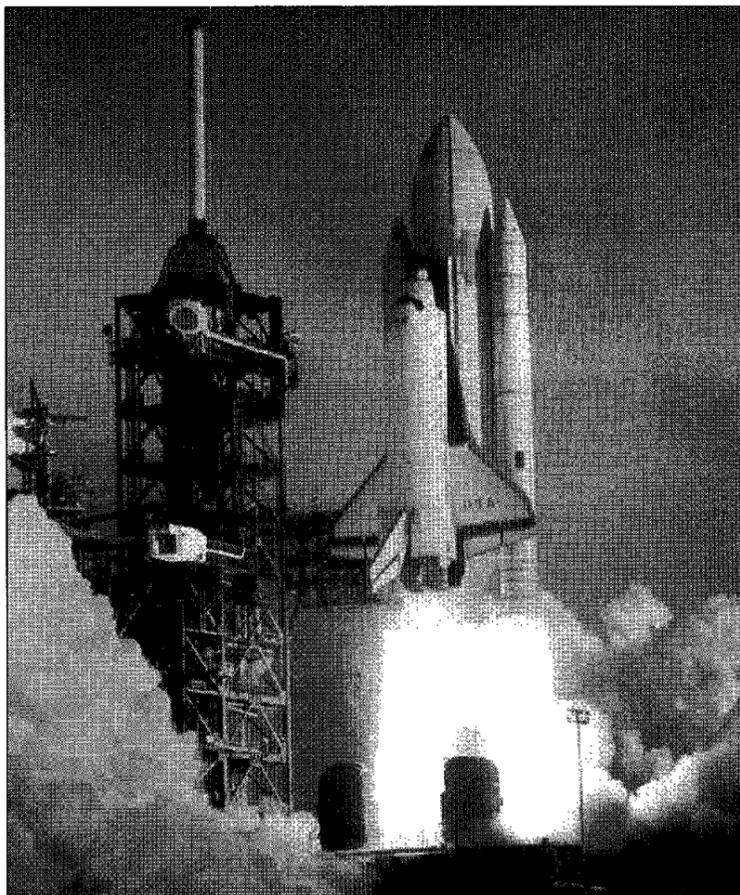
Gagarin was born in the village of Klushino in the Western Soviet Union. His father was a carpenter, of meager means. But Gagarin became fascinated with airplanes as a youngster, ultimately entering an industrial training college where he gained experience flying and parachute jumping. He joined the Soviet Air Force in 1957, and three years later, was accepted to be trained by Chief Designer Sergei Korolev as a cosmonaut. He had logged only 230 hours in the air.

Gagarin's mission 35 years ago was kept a secret from the Russian people until after he reached orbit. "I see the Earth," Gagarin told flight controllers soon after entering orbit. "The sky looks very, very dark and the Earth is bluish."

As soon as Gagarin began his one orbit of the Earth, Moscow radio announced the launch to the world. Crowds began to gather in Red Square, cheering and embracing. Traveling at a speed of five miles a second, Gagarin spent more than an hour circling the planet, drinking from a small water supply housed in a container mounted on his right shoulder. He found weightlessness very pleasant, even had success writing some notes on a pad.

The flight ended soon after it began, as an automatic computer reoriented the Vostok capsule for the retrofire to enable the ship to reenter the Earth's atmosphere. Through a pair of portholes, Gagarin saw what no human had ever seen, the fiery

Please see **GAGARIN**, Page 4



NASA Photo

After six years of silence, the thunder of manned space flight is heard again with the launch of the first space shuttle. **Columbia's launch on April 12, 1981 ushers in a new concept in space flight and carries Commander John Young and Pilot Robert Crippen. The first shuttle mission lasted 2 days, 6 hours, 20 minutes and 52 seconds.**

STS-1 party begins today

JSC's "Liftoff Party" celebrating the 15th anniversary of STS-1 begins today with a variety of activities.

The party, a combined celebration of human space flight and the rich traditions of the Russian and American space programs and their new partnership, is being held in conjunction with an all-day Saturday Russian festival sponsored by City of Nassau Bay, the sister city of Star City, Russia.

The party will be held today at Space Center Houston from 5-9 p.m. A short program will include guest speakers John Young, Cosmonaut Vladimir Titov and a special message from Lucid. Exhibits will include photographs by Andrew "Pat" Patnesky, and selected artwork by Julia Felgman, Andre Sokolov and Alexei Leonov.

Nassau Bay's Saturday activities kick off at 6:30 a.m. with the launch

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Columbia hailed as incredible flying machinery

[Editor's note: Today is the 15th anniversary of the first launch of a reusable spacecraft, the Space Shuttle Columbia. This is a reprint of the story that ran in the April 14, 1981, edition of Space News Roundup.]

Spaceship **Columbia** roared into orbit April 12 from Florida's Kennedy Space Center.

Maneuvering through space and circling Earth 36 times, Astronauts John Young and Robert Crippen tested its systems then landed like an airplane on schedule, 2 days, 6 hours, 20 minutes and 52 seconds later.

The world hailed **Columbia** as the first true spaceship — an incredible flying machine. It heralded the beginning of the era of manned round-trip travel from Earth.

The launch preceded with a message nine minutes before liftoff from President Ronald Reagan. It was read by George Page, Shuttle launch director:

"You go forward this morning in a daring enterprise and you take the hopes and prayers of all Americans with you," said the President's message.

"As you hurtle from Earth in a craft unlike any other ever constructed you will do so in a feat of American technology and American will."

Rising on a throne of 6.6 million pounds of thrust, **Columbia** at first flew steeper than programmed, its three main hydrogen-powered engines and two solid rocket motors driving skyward.

Columbia made a 100-degree roll to the right heading for its imaginary target. Two minutes and 12 seconds later, the solid rocket boosters were jettisoned, to be recovered later 151 miles downrange.

Eight minutes and 34 seconds later, the main engines cut off. The speed was 25,670 feet per second. The external tank was jettisoned and broke up over the Indian Ocean, debris landing as programmed 21,000 miles downrange from Kennedy Space Center.

Columbia's Orbital Maneuvering System (OMS) took over at 10 minutes firing for 1 minute and 27 seconds to establish an orbit of 132 by 57 nautical miles. A second OMS burn achieved a 130-mile circular orbit. A third at 6 hours 20 minutes set the orbit at 148 by 131.7 miles and a fourth added 30 feet-per-second to set the circular orbit at 149.3 by 147.6.

Columbia then began a series of tests. Its payload bay doors were opened twice, allowing astronauts to utilize the space radiator cooling systems.

The morning of Day 3 arrived and Astronauts Young and Crippen readied for the crucial test of a winged Earth entry and wheels-down landing. Previous spacecraft returned to Earth with parachutes and splashdown.

Earth entry lasted about 31 minutes as the spacecraft **Columbia** entered the atmosphere 400,000 feet above Earth. At this point

Please see **COLUMBIA**, Page 4



Endeavour work enters home stretch

By James Hartsfield

Preparations for a mid-May launch of **Endeavour** entered the home stretch this week as the orbiter was rolled out of its hangar to Kennedy Space Center's Vehicle Assembly Bldg. to be mated with the STS-77 solid rockets and fuel tank.

Endeavour is expected to be moved to Launch Pad 39B on Tuesday morning, a schedule that could allow a launch as early as May 16. Monday, the Spacehab payloads will be delivered to the launch pad to await **Endeavour**.

The STS-77 crew — Commander John Casper; Pilot Curt Brown; and Mission Specialists Andy Thomas, Dan Bursch, Mario Runco and Marc Garneau — will travel to KSC on April 23 for a dress rehearsal of the launch countdown.

Elsewhere, the ferry flight of **Atlantis** from California to Florida encountered problems this weekend as it departed Edwards Air Force Base. One of the



four engines on the Shuttle Carrier Aircraft, a modified Boeing 747, showed indications of a possible fire just after takeoff from Edwards on Saturday. SCA Pilots Gordon Fullerton and Tom McMurtry shut down the right inboard engine and returned for a landing at Edwards without incident on the remaining three engines. The SCA and **Atlantis** were airborne for a total of less than 15 minutes.

Technicians immediately began work to replace the engine and prepare for another departure, perhaps as early as late this week. **Atlantis** and the SCA were not damaged.

Meanwhile, **Columbia** is in the Bay 2 shuttle processing hangar at KSC being readied for a mid-June launch on STS-78. Upcoming milestones include the installation of main engines beginning on Wednesday and installation of the Life and Microgravity Sciences module into the payload transfer canister April 22.

Mir experiments under way

Priroda science module to launch soon

By Kyle Herring

Two weeks after **Atlantis'** undocking from the Russian Mir Space Station, the Mir-21 crew has settled into an on-orbit routine of experiment work, including material and life sciences research as well as Earth observations that begins a permanent U.S. presence in space.

Meanwhile, at the Baikonur launch site in Kazakhstan, the Priroda module scheduled for launch later this month is in its final stages of preparation.

Cosmonaut/Researcher Shannon

Lucid and her Russian cosmonaut colleagues Commander Yuri Onufrienko and Flight Engineer Yuri Usachev have begun a series of experiments designed to be carried out over the course of their long-duration flight that will better demonstrate what life on the International Space Station will be like.

Officially Lucid became a member of the Mir-21 crew while **Atlantis** was docked to the station. Since the shuttle's departure, her activities, along with the cosmonauts' are coordinated at the Mission Control

Center in Kaliningrad outside Moscow with inputs from a NASA science expert consulting group in Moscow.

Last week the crew focused on the first of many experiments called the Optizon Liquid Phase Sintering Experiment, or OLIPSE. The American experiment is the first designed to be conducted in the Russian furnace. The Optizon furnace operates at high-temperatures to process materials for further study on the ground.

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As she floats from one spacecraft to another, Mir-21 Cosmonaut Researcher Shannon Lucid is surrounded by a large delivery of new supplies for the Russian Mir Space Station.

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Store from 10 a.m.-2 p.m. Monday-Thursday and 9 a.m.-3 p.m. Friday. For more information, call x35350 or x30990.

Bluebonnet Bus Trip: April 20, tickets cost \$10.

Casino trip: Players Island bus trip April 27. Tickets cost \$5.

Home tour: Galveston Historic Home Tour May 4-5 and May 11-12. Tickets cost \$13.50.

Concert: Bay Area Chorus presents "Music of the Americas," at 8 p.m. April 26 at the Bay Harbour United Methodist Church. Tickets cost \$8 for adults and \$5 for students and seniors.

Astroworld: One day pass cost \$17.25.

Fiesta Texas: One day pass cost \$17.25.

Six Flags: One day pass cost \$17.25.

Sea World: Adult tickets cost \$24.50, Children (3-11) cost \$17.25.

Space Center Houston: Discount tickets, adult, \$8.75; child (3-11), \$7.10.

Movie discounts: General Cinema, \$4.75; AMC Theater, \$4.50; Sony Loew's Theater, \$4.75.

Stamps: Book of 20, \$6.40.

JSC history: *Suddenly, Tomorrow Came: A History of the Johnson Space Center.* Cost is \$11.

Metro tickets: Passes, books and single tickets available.

Upcoming events: Houston International Festival April 20-21 and April 27-28. Tickets cost \$2.25.

JSC

Gilruth Center News

EAA badges: Dependents and spouses may apply for photo identification badges from 7 a.m.-9 p.m. Monday-Friday; and 8 a.m.-4 p.m. Saturdays. Dependents must be between 16 and 23 years old.

Intercenter run: Runs throughout April. For more information call the Gilruth. Fitness Challenge—1996 Fitness Challenge runs to Aug. 31. Employees are eligible to win \$100 gift certificates. For more information call Larry Wier at x30301.

Defensive driving: One day course is offered April 20. Cost is \$25. Interested employees should call the Gilruth.

Stamp club: Meets at 7 p.m. every 2nd and 4th Monday in Rm. 216.

Women's self defense: Martial Arts training for women only from 5-6 p.m. Tuesdays and Wednesdays. Cost is \$25 a month.

Weight safety: Required course for employees wishing to use the weight room is offered from 8-9:30 p.m. April 25. Pre-registration is required. Cost is \$5.

Exercise: Low-impact class meets from 5:15-6:15 p.m. Mondays and Wednesdays.

Aikido: Martial arts class meets from 6:15-7:15 p.m. Tuesday and Wednesday. Cost is \$25 per month. New classes begin first of each month.

Aerobics: Class meets from 5:15-6:15 p.m. Tuesday and Thursday. Cost is \$32 for eight weeks.

Ballroom dancing: Cost is \$60 per couple. For additional information call the Gilruth Center at x33345.

Country and Western dancing: Beginner class meets 7-8:30 p.m. Monday. Advance class meets 8:30-10 p.m. Monday. Cost is \$20 per couple.

Fitness program: Health Related Fitness Program includes a medical examination screening and a 12-week individually prescribed exercise program. For more information, call Larry Wier at x30301.

JSC

Swap Shop

Property

Sale: Webster condo, 2-2-2CP, new A/C, kit & bath upgrade, FPL, W/D conn, \$37.5k. 280-0285.

Sale: CL Oakbrook, 4-2-2.5, 2 family rms, whirlpool bath, new roof/outside paint, oriental garden, pond, ex cond, \$99.5k. 480-5672.

Sale: Friendswood, Heritage Park Village, 3-2.5-2+ opt 4 BDR, 2137 sq ft, ex cond, \$110k. 992-4043.

Sale: Wooded lot 90'x135' in Taylor Lake Estates, \$39.5 can finance. Don, x38039 or 333-1751.

Sale: LC Bayridge, 3-2-2, cul-de-sac, new roof, \$55k make offer. James, 286-1934.

Sale: Laporte/Creekmont, 3-2-2, w/FPL, new roof, new carpet/linoleum, fresh paint, \$65.5k. 992-5080.

Sale: 26.8 acres, Dimebox, TX, 28' x 70' dbl wide, 3-2-2D, FPL, porch, utility bldg, barn, 2 large ponds, cross-fenced, coastal grass. 473-0117.

Sale: Brookforest, 4-2.5-2D, 2 story english, trees, near school, \$150k. 488-5542.

Lease: Waterfront townhouse w/45' boatslip, private marina, 2-2.5-2, W/D, FPL appli, fans, sec gates, avail 5/1. 483-4915.

Sale: CL Oakbrook, 2-2-2, FPL, deck, indoor hottub, lg fen lot, ex cond, \$83.5k. 286-4379.

Lease/Sale: The Landing, condo, 2-1, carport, 900 sq ft, W/D, all bill paid, \$600 mo. Carol, 333-2714.

Sale: Brookforest, 4-2-2, 2.3k sq ft, FPL, new carpet/paint/tille, A/C heat, \$140k. Brian, x32635 or 480-4351.

Lease: Brookforest, 3-2-2, partially furnished, FPL, spa, fans, & other extras. x34132 or 486-5331.

Rent: Santa Fe, TX, duplex, 3-1.5, FLR & DRM, appli, A/C/heat, W/D conn, adults, non-smokers, no pets, \$550 mo + sec deposit. x40250 or 925-7839.

Sale: University Trace condo, 1 BDR + study, new paint/carpet, appliances. \$32.5k. 333-3925.

Lease/Sale: Egret Bay condo, 1-1-2, W/D, \$475 mo + dep, buy nego. Mike, x32794 or 486-9876.

Sale: Wooded residential lot, 1 + acres, Tomball area, deed restricted, paved streets, electric, water, \$9k terms. 333-4609.

Lease: Heritage Park, 3-2-2, avail 6/1, \$800 mo. 482-2926.

Sale/Lease: Meadowbend, 3-2-2, living room & dining room, lg kitchen, large back yard. 338-1799.

Sale: Clear Lake, 2-2-2C, upstairs corner remodeled condo, FPL, wet bar, appli, \$43.9 or 333-7720.

Cars & Trucks

'76 Buick Regal, 2 dr, blue, 350 V8, 81.5k mi, good cond, \$1.4k. Conner, x38193.

'82 Corvette Collectors Edition, 42k mi, show car cond, loaded, garaged, \$14,850. Larry, x30559.

'72 Karman Ghia, good paint, new interior, 19k mi on rebuilt engine. \$5.5 obo. x31440 or 333-5693.

'68 Mustang, white, 289 4 spd trans, lots of new parts. \$3.7k. x41948 or 482-3169.

'92 Chevy Lumina, Euro 3.4, black w/grey inter, all options, w/Delco Bose AM/FM/cass, alarm, 1 owner, garaged, ex cond, \$9.5k. Ron, x33196.

'95 Camaro Z28, t-tops, Bose stereo, P/W & P/S 15k mi, ex cond, \$17.9k. x47540 or 326-1782.

'92 Mits. Eclipse, 5 spd, ex cond, P/W & P/L, A/C, AM/FM/cass, rebuilt motor/trans. Eugene, 926-4378.

'86 Honda Prelude Si, red/black, sunroof, good cond, tint windows, \$3k. Lisa, x40213 or 554-4140.

'91 Hyundai Scoupe, red, sunroof, 70k mi, AM/FM/cass, \$4.9k. Geraldine, 283-0287.

'90 LeBaron conv, ex cond, 29k mi, new tires, CD, 7 yr warr, leather, \$8.5k. 488-6526.

'88 Honda Civic, 5 spd, A/C, AM/FM/cass, sunroof, \$2,500. 996-1287.

'87 Chevy Celebrity station wagon, 63k mi, 1 owner, ex cond, x32444 or 996-9410.

'92 Pontiac Sunbird SE, loaded, 4 cyl, auto, very good cond, \$8 k. neg. K.D., x36228.

'91 Ford Thunderbird, V8 302 eng, loaded, 49k mi, \$7.2k obo. 479-5334 or 916-3786.

'85 Cadillac Eldorado, silver/blue int, 1 owner, loaded, ex clean. 335-6633 or 427-4167.

'84 Mazda RX-7 GSLI-SE, black/red, 5 spd, sunroof, AM/FM/cass, good cond, \$2,950. 318-0412.

'75 HD FLH, fully restored, super clean, \$9k. Scott, x49854 or 282-9185.

'88 Toyota Celica, A/C, AM/FM/cass, 96k mi, new tires, \$4.2k. Rusty, x38167.

'93 GMC 3/4 ton V8 custom, pwr, cruise, alarm, new tires/brakes, 37k mi, Mark III pkg, \$16.5k. Melissa, x41928 or 338-6798.

'76 Classic Cadillac El Dorado, good body/motor, \$1.5k obo. Mario, x48172 or 538-1918.

'94 Camaro, maroon, A/C, AM/FM/cass, new tires, cruise, 5 spd, \$11.3k obo. x31443 or 997-8044.

'89 Acura Integra LS, 5 spd, loaded, good cond, \$5.5k. Jeff, 286-5630.

'89 Ford Crown Victoria LX, auto, V8, 68k mi, A/C, AM/FM/cass, clean, power, loaded, \$6.2k. 333-0267.

'85 Chevette, needs radiatorhood/bumper; 35/W Ford motor, rebuildable; Class III adj drop down ball mount 1 7/8" & 2". Bobby, x38823 or 337-4134.

'91 Ford Taurus SW-GL, new A/C/trans, clean, 76k mi, \$4.9k. 283-4230.

'84 Toyota Celica, AT, AM/FM, \$950 obo. Kenny, x39139 or 554-2249.

'90 Dodge Shadow, white, 5dr, auto, tilt wheel, ex cond, low miles, \$5.2k. Roland, x48540 or 992-1430.

'92 Mazda Miata, ex cond, loaded, detach hardtop, 100k mi, or 6 yr warr, new tires, 39k mi. 486-5793.

'76 MG Midget, Brit racing green, restored, ex cond, \$5k obo. Shane, x41022 or 992-1162.

Boats & Planes

'94 SeaRay SeaRayder, 14' 90HP jet, access, warranty, garage kept, ex cond, \$6k or take up payments. x47922 or 331-8521.

'85 Chris Craft Sportsman, 36', twin Mercruiser engines, shower, toilet, refrig, low eng hrs, large open back deck, \$35k obo cash only. 339-1197.

Boston Whaler, 13', 40HP Evinrude '91, Sportsman trlr, \$3k obo. David, x47942 or 331-9377.

'79 Glastron Carlson CVX16, runabouts, 1 in very good cond, \$3,250; 1 needs repair, \$800. x47878 or 941-1512.

Catamaran, 18' Prindle, trailer w/cat-box storage, multi color sails, dbl trapeze, \$1.3 obo. Jim, x38531 or 334-6000.

'90 Maxum, 18' boat, Mercruiser 130, I/O, stainless prop, galv trailer, some upholstery repair needed, \$3.5k. Melissa, x41928 or 338-6798.

Windsurfing equip, Mistral Challengeflex, \$75; Bic Rap, \$375; Westwind, \$175, sails & extra equip. Dave, 486-8487.

'78 35Hp Johnson outboard motor w/all controls, electric start, long shift. 480-3839.

Cycles

2 lg helmets, Shoei RF200, candy red, Chrome

JSC

Dates & Data

Today

CTAP workshops: The Career Transition Assistance Program will hold part one of the CTAP workshop from 8 a.m.-noon and the CTAP workshop part two from 1-5 p.m. April 12 in Bldg. 45 Rm. 304. For more information call Amy Mendez at x32604.

Crew briefing: The STS-76 crew will share flight memories at 12:30 p.m. April 12 in Teague Auditorium.

STS-1 party: JSC's "Liftoff Party" celebrating the 15th anniversary of STS-1 will be held from 5-9 p.m. April 12 at Space Center Houston. Tickets cost \$5 and are on sale at the Bldg. 11 Exchange Store. For more information call the Exchange Store at x35350.

Cafeteria menu: Special: tuna noodle casserole. Total Health: broiled chicken breast. Entrees: deviled crabs, broiled pollock, liver and onions, broiled chicken with peach half, Reuben sandwich. Soup: seafood gumbo. Vegetables: Italian green beans, cauliflower au gratin, steamed rice, vegetable sticks.

Monday

Cafeteria menu: Special: Italian cutlet. Total Health: herb flavored steamed pollock. Entrees: barbecue beef spare ribs, steamed pollock, baked chicken. French dip sandwich. Soup: black bean and rice. Vegetables: California mix, okra and tomatoes, vegetable sticks, ranch style beans.

Tuesday

Cafeteria menu: Special: spaghetti with meatballs. Total Health: baked potato. Entrees: stir fry beef, liver and onions, beef cannelloni, ham steak French dip sandwich. Soup: split pea. Vegetables: winter blend mix, seasoned cabbage, breaded squash, lima beans.

Wednesday

Toastmasters meet: The Space-land Toastmasters will meet at 7 a.m. April 17 at the House of Prayer Lutheran Church. For more information call Jeannette Kirinich x45752.

Astronomers meet: The JSC Astronomy seminar will meet at noon April 17 in Bldg. 31, Rm. 129. John Connolly will discuss "Adventures in Hollywood: Advising on Flight to Mars." For more information call Al Jackson at x35037.

Cycle club: The Space City Cycle Club will meet for a 25-mile ride beginning at 6 p.m. April 17 at the University of Houston Clear Lake soccer field. For more information on this ride and weekend rides call Mike Prendergast at x45164.

Scuba club meets: The Lunarfins will meet at 7:30 p.m. April 17 at Redfish Restaurant under the Kemah/Seabrook Bridge, Seabrook Side. For more information call Fred Toole at x33201.

Cafeteria menu: Special: smoked barbecue link. Total Health: roast porkloin. Entrees: cheese enchiladas, roast pork and dressing, baked chicken, steamed pollock, Reuben sandwich. Soup: seafood gumbo. Vegetables: Italian green beans, Spanish rice, turnip greens, peas and carrots.

Thursday

Directors' meet: The Space Family Education Board of Directors will meet at 11:30 a.m. April 18 in Bldg. 45 Rm. 712D. For more information on this open meeting call Gretchen Thomas at x37664.

Cafeteria menu: Special: chicken fried steak. Total Health: roast beef with gravy. Entrees: steamed pollock, lasagna with meat, steamed pollock, catfish, French dip sandwich. Soup: cream of turkey. Vege-

tables: whole green beans, butter squash, cut corn, black-eyed peas.

Friday

Reservations due: The NASA JSC Chapter of the National Management Association will meet at 5 p.m. April 25 at the Gilruth Center. Greg Hayes and Wayne Draper will discuss the JSC Lead Center Transition status. Reservations must be made no later than noon April 19. For more information call Kathleen Kaminski at x38706.

CTAP class: The Career Transition Assistance Program will host a class on Networking from 1-4:30 p.m. April 19 in Bldg. 45 Rm. 304. For more information call Amy Mendez at x32604.

Cafeteria menu: Special: fried chicken. Total Health: vegetable lasagna. Entrees: pollock hollandaise, beef stroganoff, vegetable lasagna. Vegetables: steamed broccoli, carrots vichy, Italian zucchini, breaded okra.

April 23

BAPCO meets: The Bay Area Personal Computer Organization will meet at 7:30 p.m. April 23 in the Community Room at League City Bank and Trust, 300 East Main St. Richard Melvin will discuss Networking. For details call Guy Thibodaux at 333-5340 or tibido@AOL.com

April 25

Radio club meets: The JSC Amateur Radio Club will meet at noon April 25 in Bldg. 216 Rm. 253. For details call Larry Dietrich at x39198.

CTAP class: The Career Transition Assistance Program will host a class on Phone Skills from 1-4:30 p.m. April 25 in Bldg. 45 Rm. 304. For more information call Amy Mendez at x32604.

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'95 Camaro Z28, t-tops, Bose stereo, P/W & P/S 15k mi, ex cond, \$17.9k. x47540 or 326-1782.

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'91 Hyundai Scoupe, red, sunroof, 70k mi, AM/FM/cass, \$4.9k. Geraldine, 283-0287.

'90 LeBaron conv, ex cond, 29k mi, new tires, CD, 7 yr warr, leather, \$8.5k. 488-6526.

'88 Honda Civic, 5 spd, A/C, AM/FM/cass, sunroof, \$2,500. 996-1287.

'87 Chevy Celebrity station wagon, 63k mi, 1 owner, ex cond, x32444 or 996-9410.

'92 Pontiac Sunbird SE, loaded, 4 cyl, auto, very good cond, \$8 k. neg. K.D., x36228.

'91 Ford Thunderbird, V8 302 eng,

Hail Columbia!

The Way It Was

(Following are segments of Mission Control/air-to-ground commentary and conversation as published in the April 14, 1981 Space News Roundup.)

LC T-1 min. 10 sec. and counting. Liquid hydrogen tank is at flight pressure. T-1 min. mark and counting. The firing system for the sounds suppression water will be armed and in just a couple of seconds from now. It has been armed. T-45 sec. and counting. T-40 sec. and counting. The development flight instrumentation recorders are on. T-35 sec. We are just seconds away from switching to the redundant set sequencer. T-27 sec. We have gone for redundant set sequencer start, T-20 sec. and counting. T-15, 14, 13, T-10, 9, 8, 7, 6, 5, 4, we have gone for main engine start, we have liftoff of America's first Space Shuttle and the Shuttle has cleared the tower.

CAPCOM Roger. *Columbia* Houston, you're go at throttle up.

SC Roger, go at throttle up.

CAPCOM Roger *Columbia* on the nice ride. You're lofting a little bit so I think you'll probably be slightly high at staging.

PAO One minute forty five seconds, coming up on go/no go.

CAPCOM *Columbia*, you're negative seats.

PAO That callup says that *Columbia*, the altitude is too high for ejection seat use.

CAPCOM *Columbia*, you are go for SRB sep.

PAO Two minutes, four seconds, standing by for SRB sep confirmation.

PAO Mark two minutes twenty seconds, confirm solid rocket booster sep.

PAO Mark two minutes 30 seconds, on board guidance system converging as programmed, *Columbia* is now steering for its precise window in space for main engine cutoff. Mark two minutes forty seconds *Columbia* now 39 nautical miles in altitude 42 nautical miles downrange. Mark two minutes 50 seconds *Columbia*...

CAPCOM *Columbia*, you're looking a little hot. All your calls will be a little early.

SC Okay

PAO *Columbia* now has two engine Rota capability.

SC ...Looks good here.

PAO Mark, three minutes. Young and Crippen really moving out now, velocity now reading 6200 feet per second. Mark 3 minutes 15 seconds, *Columbia* now 51 nautical miles in altitude, 66 nautical miles downrange, velocity now reading 6500 feet per second. Mark 3 minutes 30 seconds, *Columbia* now 55 nautical miles altitude, 78 nautical miles downrange. Mark 3 minutes forty seconds, standing by for a return status check in mission control by Flight Director Neil Hutchinson. *Columbia* given a green to continue.

PAO ...40 sec., standing by for a return status in Mission Control by Flight Controller Neil Hutchinson. *Columbia* given a green to continue. Mark 3 min. 55 sec., standing by for a press to MECO.

CAPCOM Stand by press to MECO.

PAO *Columbia* continues flying forward. Coming up on an emergency turn.

CAPCOM Ready for press to MECO.

SC Roger, press to MECO.

PAO Mark 4 min. 8...

CAPCOM *Columbia*, stand by for negative return. Mark negative return.

SC Mark 4 min 25 sec with that call up from CAPCOM Brandenstein. *Columbia* now committed to space travel. Young and Crippen can no longer turn around and return to launch site.

SC What a view, what a view!

CAPCOM Glad, you are enjoying it.

PAO Mark 5 min 15 sec. *Columbia* now 75 nautical miles altitude, 202 nautical miles downrange. Lofting now reading 11,000 feet per second. A status check in Mission Control by Flight Director Neil Hutchinson.

CAPCOM *Columbia*, Houston you are go at 5:30, MECO 8 + 34.

PAO Mark 5 min 40 sec. That callup from CAPCOM Brandenstein says *Columbia* projective navigation and engine performance are good.

CAPCOM *Columbia*, you are single engine press to MECO.

PAO Mark 7 min 20 sec. That report says that Young and Crippen can achieve orbit insertion even if two engines go out. Mark 7 min 30 sec. *Columbia* 67 nautical miles altitude, 485 nautical miles downrange. G force is building for Young and Crippen, now. Up to 3 g's. Mark 7 min 45 sec. *Columbia's* main engine slowly needs throttle back now, should be throttled at 65 percent, that is 6 sec before main engine cutoff. Status check in the Control Center.

CAPCOM *Columbia*, Houston, you are go at 8.

PAO Mark 8 min 4 sec.

SC Looking good.

PAO *Columbia* now 63 nautical miles altitude, 606 nautical miles downrange. Mark 8 min 15 sec. *Columbia* now 63 nautical miles altitude, 650 nautical miles downrange. Standing by now for main engine cutoff.

SC Okay, MECO, 25, 6, 7, 0 up and doing it at 20 fps.

CAPCOM Roger, *Columbia*. MECO.

PAO Confirm shutdown. *Columbia*, the gem of the ocean, now in space, not yet in orbit. Standing by now for external tank separation.

CAPCOM Roger, *Columbia*, MECO. Confirm shutdown, *Columbia*, the gem of this new ocean now in space not yet in orbit. Standing by now for external tank separation. Roger, we confirm the sep, *Columbia*. Nine minutes 3 seconds, confirm external tank separation. *Columbia* now performing an evasive maneuver moving below and beyond the translative and north of the external tank. Young should see it moving away out of his window. Nine minutes and 40 seconds go-no-go status check emission control for the first OMS burn. Give it a Go. *Columbia*, Houston, you are go for nominal/OMS 1 and for APU shut down on time.

PAO Mark nine minutes 55 seconds. *Columbia* now maneuvering through its OMS 1 burn attitude. Using the two 6,000 pounds thrust engine OMS 1 will be post-ignite. Moving *Columbia* forward on her flight path placing *Columbia* in orbit. Standing by for ignition 10 minutes 22 seconds — *Columbia* 67 nautical miles in altitude, 1100-1160 miles downrange.

SC Okay, we got 102 on the left and 101 on the right.

CAPCOM Roger, *Columbia*. You're looking good to us. A status check of the Control Center. *Columbia*, Houston, we have 40 seconds until LOS. Configure LOS. You're looking good. We'll see you in Madrid.

SC Seconds to go. We are in a 97 by 42 right now.

PAO This is Shuttle Control Houston at 15 minutes 30 seconds MET. Jay Greene reports the OMS 1 burn was normal. Time of ignition 10 minutes 37 seconds MET Delta V 164.7 feet per second. Duration of the burn 1 minute 27 seconds. Resulting orbit apogee 132 nautical miles, perigee 57 nautical miles so *Columbia* is now in orbit. Also *Columbia* weighed 4 and one half million pounds at launch. She now weighs about 214,000 pounds.

SC Okay. We're looking good, the burn looked normal. The OMS 1 burn.



PAO We have a report that the solid rocket booster chutes worked okay. Both solid rocket booster chutes in the water floating normally. This is Shuttle Control Houston, 49 min Mission Elapsed Time, we have a report from the surgeon that Bob Crippen's heart rate at liftoff was 130 and John Young's heart rate ranged between 85 and 90 at liftoff.

PAO This is Shuttle Control at 59 min MET, coming up on loss of signal through Yaragadee. The next station to acquire will be Orroral Valley. We had a report from the crew aboard *Columbia* that they performed the OMS 2 burn as programmed and are presently moving into OPS 2, the on-orbit, onboard computer program.

SC You're missing one fantastic sight. Here comes the right door and boy that is really beautiful out there.

CAPCOM We appreciate the great view updates.

SC Roger that.

CAPCOM Right door now open.

SC We can see a little trash floating out of the payload bay, but nothing really all that significant.

SC All the latches work just fine and the door looks like she's doing her thing.

CAPCOM *Columbia*, Houston. We are about 30 sec from TBA or port door is now closed.

SC OK. I just got the right door closed. All that came back nicely. We are getting ready to latch it back up.

SC I can stop it up, up here if you wish. OK. Doors all latched up beautiful. We are getting ready to open them back up again.

CAPCOM Roger.

PAO That report from Bob Crippen...

SC OK, what camera are y'all looking at now, do you know?

CAPCOM Roger, we're looking out the forward camera.

SC OK, we're — we want to tell y'all here we do have a few tiles missing off both of them — off the starboard pod, basically it got what appears to be 3 tile and some smaller pieces and off the port pod — looks like — I see one full square and looks like a few little triangular shapes that are missing and we are trying to put that on TV right now.

PAO Young also reported that the tiles on the wing or wings appeared to be intact. Meanwhile JSC Engineering and Development Director Max Faget, is in the Control Center and watched the television transmission of the missing tiles. He reports that these are not critical tiles. These tiles that are missing represent no hazard to the vehicle on the crew. Dr. Faget further states that the worst that can happen is that after landing a small patch of skin underneath the tiles may have to be replaced.



PAO This is Mission Control Houston. Dekar has loss of signal. Quiet pass. The crew is busy donning their pressure suits. The de-orbit ignition time is 3 hours 29 min, 17 sec from now. That set an elapsed time of 2 days, 5 hours, 21 min 30 sec. The Delta V, or the change in velocity of that maneuver will be 297.6 fps. Duration of the burn 2 min. 39.5 seconds. *Columbia* will be flying tail first. There will be a retrograde maneuver, burning both the OMS engines. Entry interface expected to occur at an elapsed time of 2 days, 5 hours 49 min. 1 sec at an altitude of approximately 400,000 feet at a range from the landing site at Edwards of about 4400 miles. Blackout will begin at 2 days, 5 hours, 51 min. 44 sec at an altitude of approximately 330,000 feet and a range of 3,700 miles.

PAO *Columbia* maneuvering to burn attitude now.

PAO This is Mission Control. We are at mark 1 minute from de-orbit ignition.

SC Burn was on time and nominal. Three started fine also. We have got two and three running now.

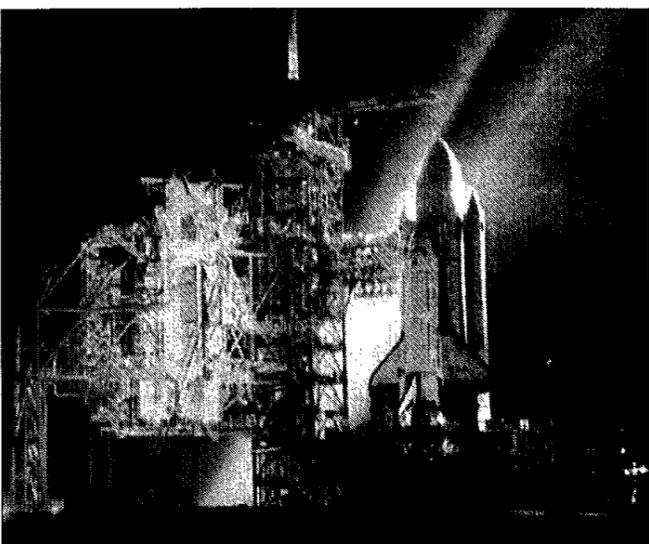
CAPCOM Hey, *Columbia*, we are 50 sec from LOS. Everything looks perfect going over the hill. Nice and easy does it John, we are all riding with you.

SC Roger that.

CAPCOM Ten seconds until LOS. We will see you at about MACH 12.

SC Bye, bye. Looking forward to that.

PAO This is Mission Control. Guam here has lost its signal. *Columbia* is 1 min 32 sec away from entering the Earth's atmosphere. We are showing 34 min 21 sec to touchdown at Edwards Air Force Base. We will be out of communication with *Columbia* for approximately 21 min. No tracking stations before the west coast. And there is a period of about 16 min of aerodynamic reentry heating that communications are impossible during this entry however there are no tracking stations to receive any communications either. *Columbia* in good shape and the crew in good shape for this entry. Two experiments aboard *Columbia* as part of the Orbiter experiments program managed by NASA's Officer in nautical space technology will be conducted during this entry. One of them is the infrared imagery of Shuttle, the acronym IRIS, will be conducted from a C-141 operated by NASA's Ames Research Center in California using a 36-inch telescope aboard the C-141. They will attempt to get about 4 milliseconds of information from the underside and sides of the Orbiter. Objective is to obtain high resolution infrared imagery during entry from which surface temperatures and aerodynamic heating may be inferred. This C-141 is known as the Gerald P. Kiper airborne observatory. It is named for the late Dr. Kiper,



the founder of the Lunar and Planetary Lab at the University of Arizona. He was active in ranger and surveyor missions, Mercury, Venus, and the Pioneer 10 mission to Jupiter. *Columbia* should see maximum surface temperatures during entry of 2,750 deg F on the wing leading edge that will diminish to less than 600 deg F on the upper fuselage. At Edwards Air Force Base and the Dryden Flight Research Center, enormous crowds are beginning to assemble.

PAO This is Shuttle Control, NASA/Dryden. The estimated 75,000 members of the public to view the Shuttle launch at Kennedy Space Center, may be more than doubled during the landing here on Rogers dry lake. An estimated 150,000 visitors are expected at the public viewing site on the west side of the lake bed. This number will be swelled to approximately 170,000 by those at the other viewing sites. A sonic boom should be audible to viewers here. *Columbia* should go subsonic just about the time it approaches from the west. And consequently the western edge of the lake bed.

PAO Now at 70,000 feet at MACH 1 point eight range 42 miles.

CAPCOM *Columbia*, we show you very slightly high in altitude, coming down nicely, and the tests is to go to off.

PAO MACH 1.3 at 58,000 feet, range 33 miles.

CAPCOM Out of 56 K, looking good.

PAO MACH 1 at 51,000 feet, range 28 miles.

CAPCOM *Columbia*, you're going subsonic now. Out of 50 K, looking good.

SC Roger.

PAO Everything looking good.

CAPCOM *Columbia*, you're approaching the HAC now. Right on the money.

PAO Range 28 miles

CAPCOM *Columbia*, you're going subsonic now at 50 K. Looking good.

PAO Everything looking good.

CAPCOM *Columbia*, you're approaching the HAC now, right on the money.

PAO Now they're getting ready to start the big sweeping turn into the runway.

CAPCOM And Crip, the altimeter is 3009.

PAO Thirty-eight thousand feet, range 19 miles.

CAPCOM *Columbia*, you're coming right around the HCA, looking beautiful.

SC Oh, Yeah.

CAPCOM It's got about 30,000...

SC Alrighty

PAO Control very smooth.

CAPCOM *Columbia*, you're really looking good, right on the money. And we're seeing 1.3 Gs coming around the HCA.

CAPCOM And turning on the final, your winds on the surface are calm.

SC That's my kind of wind.

PAO Twenty-five thousand feet, MACH .6, range 13 miles, 22 thousand feet. Control looking very smooth. We have a television picture now.

CAPCOM You're right on the glide slope, *Columbia*.

CAPCOM Right on glide slope, approaching center line, looking great.

CAPCOM Airspeed 271 knots. FIDO says it couldn't be any better.

PAO Eleven thousand feet.

CHASE Nine thousand, 280 knots.

ONE Clear (garble) they're down, pick up your feet. Five, four, three, two, one, touchdown. (garble) Welcome home, *Columbia*. Beautiful, beautiful.

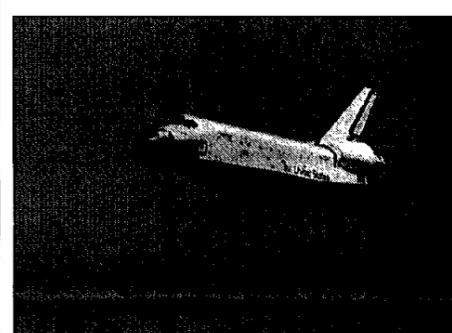
SC Do I have to take it up to the hangar, Joe.

CAPCOM We're going to dust it off first.

SC This is the world's greatest flying machine, I'll tell you that. It worked super.

CONVOY Okay, convoy north, wheels stopped on *Columbia*, wheels stopped.

PAO This is Mission Control, Houston. The official touchdown time is 2 days, 6 hours, 20 minutes, 52 seconds. □



Astronauts Walker, Harris leave corps next week

By Eileen Hawley

Astronauts Dave Walker, and Bernard Harris will leave NASA on Monday to pursue other careers.

Walker will be the Vice President, Sales and Marketing, for NDC Voice Corporation in Southern California. NDC Voice will provide integrated wireless communications and advanced voice processing applications internationally.

Harris will become the Staff Vice President of Operations for Spacehab, Inc., in Houston. Spacehab owns and operates habitable modules which fly in the cargo bay of the

space shuttle and are used for microgravity research and space station resupply activities. He also joins the teaching staff of the University of Texas Medical Branch, Galveston Center for Aerospace Medicine and Physiology as associate professor in internal medicine.

"Dave and Bernard have played key roles in our space program," said David Leestma, director of Flight Crew Operations. "Their expertise, skill and dedication will be missed."

Walker is a veteran of four shuttle flights and has logged over 724 hours in space. He was the pilot on STS 51-A

in 1984, the first space salvage mission in history that retrieved for return to Earth the Palapa B-2 and Westar VI. As mission commander of STS-30 in 1989, Walker and his crew successfully deployed the Magellan Venus-exploration spacecraft, the first U.S. planetary science mission launched since 1978, and the first planetary probe to be deployed from the shuttle. Walker next commanded a five-man crew on STS-53 in 1992 that deployed the classified Department of Defense payload. Walker's final flight, STS-69 in 1995, deployed and retrieved a SPARTAN

satellite and the Wake Shield Facility.

Harris has logged more than 438 hours in orbit, flown two space shuttle missions and was the first African-American to walk in space.

In his first shuttle flight, Harris was a mission specialist on STS-55 in 1991—Spacelab D-2—conducting a variety of research in physical and life sciences. Harris was the Payload Commander on STS-63 in 1995 that featured the first flight of the new joint Russian-American Space Program. During the flight, Harris became the first African-American to walk in space.



Walker



Harris

Four named for neurolab mission in '98

NASA has selected Jay Buckey, Alexander Dunlap, Chiaki Mukai and James Pawelczyk to train as payload specialists for the 16-day Neurolab mission.

Neurolab, dedicated to research on the nervous system and behavior, is scheduled for launch on *Columbia* in early 1998. The mission is a joint venture of six space agencies and seven U.S. research agencies. Investigator teams from nine countries will conduct 31 studies in the microgravity environment of space.

Buckey, 39, earned a doctor of medicine from Cornell University Medical College. He is a resident and instructor in medicine at the Dartmouth-Hitchcock Medical Center in Lebanon, N.H. Buckey was an alternate payload specialist for STS-58, the second Spacelab life sciences mission.

Dunlap, 35, will receive a doctor of medicine degree at the University of Tennessee College of Medicine, in May 1996.

Mukai, 43, is an astronaut with the National Space Development Agency of Japan. Mukai became the first Japanese woman to fly in space when she flew as a payload specialist on STS-65, the second International Microgravity Laboratory mission in 1994.

Pawelczyk, 35, received a doctor of philosophy degree in biology from the University of North Texas. He is an assistant professor of applied physiology at Penn State University.

Although four candidates have been selected to train as payload specialists, only two will fly on the mission. The remaining two will serve as backups, or alternates, and will be ready to serve on the mission crew if necessary. The final selection will be made approximately a year before launch.

Shuttle Facts

For missions through STS-76

Overall Shuttle Totals

| | |
|---|-------------|
| Flight days: | 606.15 days |
| Orbits: | 9,579 |
| Miles flown: | 230,534,997 |
| Payload tons launched: | 9,150 |
| Payload tons deployed and left in space: | 545 |
| Retrieved payload from orbit: | 18.5 tons |
| Total number of crew members: | 440 |
| Total number of individuals that have flown on the shuttle: | 220 |
| Number of countries represented by people flown on the shuttle: | 12 |

Space Walk Facts

- ◆ The mission with the most space walks was STS-61, *Endeavour*, with five.
- ◆ Astronaut Tom Akers has logged the most space walk time with a total of 29 hours and 41 minutes.
- ◆ The total number of astronauts who have walked in space is 37.
- ◆ The total amount of space walk time is approximately 396 hours.

Shuttle Facts

- ◆ In order to prepare an orbiter for flight, 10,000 separate tasks or "events" must take place over a 65 day period, using 40,000 technician labor hours.
- ◆ Since 1981, the shuttle fleet has flown in excess of 230.5 million miles, more than the distance from the Earth to the Sun and back.
- ◆ It takes only about eight minutes for the space shuttle to accelerate to a speed of more than 17,000 miles per hour.
- ◆ The shuttle main engine weighs 1/7th as much as a train engine but delivers as much horsepower as 39 locomotives.
- ◆ The turbopump on the shuttle's main engine is so powerful it could drain an average family-sized swimming pool in 25 seconds.
- ◆ The space shuttle's three main engines and two solid rocket boosters generate some 7.3 million pounds of thrust at liftoff.
- ◆ The liquid hydrogen in the space shuttle main engine is minus 423 degrees Fahrenheit, the second coldest liquid on Earth, and when burned with liquid oxygen, the temperature in the engine's combustion chamber reaches plus 6,000 degrees Fahrenheit.
- ◆ The energy released by the three space shuttle main engines is equivalent to the output of 23 Hoover Dams.
- ◆ Each of the shuttle's solid rocket motors burns 5 tons of propellant per second, a total of 1.1 million pounds in 120 seconds. The speed of the gases exiting the nozzle is more than 6,000 miles per hour, about five times the speed of sound or three times the speed of a high-powered rifle bullet.
- ◆ The combustion gases in a solid rocket motor are at a temperature of 6,100 degrees Fahrenheit, two-thirds the temperature of the surface of the sun.
- ◆ A stacked booster is the same height as the Statue of Liberty, 151 feet, but weighs almost three times as much.
- ◆ The four engines of a Boeing 747 jet produce 188,000 pounds of thrust, while just one Solid Rocket Motor produces more than 17 times as much thrust—3.3 million pounds. A pair of SRM's are more powerful than 35 jumbo jets at takeoff.
- ◆ If their heat energy could be converted to electric power, two SRM's firing for two minutes would produce 2.2 million kilowatt hours of power, enough to supply the entire power demand of 87,000 homes for a full day.
- ◆ The Shuttle's Remote Manipulator System, or robot arm, weighs about 905 pounds on Earth but can move objects about the size of a Greyhound bus in space weighing 66,000 pounds.
- ◆ The oldest astronaut to fly on the shuttle was Vance Brand who was 59 years old at the time of his flight.
- ◆ The youngest astronaut to fly on the shuttle was Sally Ride who was 32 years old on her first flight.

Gagarin greeted by cow, two farm workers

(Continued from Page 1)

glow of the craft's exterior heating to several thousand degrees as acceleration forces built to 8G's during his plunge back to Earth.

A drogue chute deployed 2 1/2 miles above the ground, followed by

the main chute a mile later to slow the capsule's descent. But, as the flight rules dictated, Gagarin parachuted from the capsule at an altitude of 4 miles, blowing the hatch to his capsule before ejecting. At 10:55 a.m., Moscow time, less than two

hours after he blasted off, Gagarin landed on a farm at Smelovka, near Saratov, in Central Asia. He was greeted only by a cow and two farm workers. A 130-foot high titanium obelisk marks where the first human in space returned to Earth.

Science experiments progress available via Internet

(Continued from Page 1)

The crew worked with the experiment well into this week to complete the processing of 70 samples of different metals for varying lengths of time in the furnace. The samples were brought up on *Atlantis* and will be returned for analysis by the University of Alabama, on *Atlantis*' next flight. The microgravity environment of space significantly affects metallurgical properties during the melting process that will allow investigators the opportunity to extrapolate the results and improve industrial technology areas such as cutting tool quality.

Other activities aboard the station this week included Earth observations with most of the scheduled sites being photographed. Photog-

raphy could be interrupted due to the attitude, or position, of the station in support of other scientific investigations.

Long-term protein crystal growth experiments are being conducted as well as space acceleration measurements that could affect the growth process. A unique container filled with cold gaseous nitrogen surrounding protein samples keeping them frozen was launched aboard *Atlantis* and has slowly begun "thawing" allowing the crystal growth process to begin. The crystals will be grown for the duration of the mission.

Daily monitoring of the quail egg experiment is being conducted as are periodic fixations of eggs throughout the mission at various stages of development. This study

will provide additional insight into embryonic development to evaluate changes due to the weightlessness of space.

The crew continued to operate these experiments throughout its workday this week. The crews workday typically begins with wakeup around 8 a.m. The crew's sleep period begins about 11 p.m.

Meanwhile, the Priroda science module, that will complete the assembly of the Mir, remains scheduled for launch on April 23 from Baikonur and dock with Mir on April 26. Last Friday, the shroud and nosecone were scheduled to be installed around the module and Monday the Russian version of the flight readiness review was held. Tuesday, the module was trans-

Key Russian interpreter dies after short illness

The U.S. and Russian space programs lost a friend Monday when Boris Goncharov died in Moscow following a short battle with cancer.

While he served part time as an interpreter for many NASA groups working with their Russian counterparts, Goncharov was best known for his work in the Russian Mission Control Center outside Moscow in Kaliningrad.

For 25 years, he served in various capacities as an expert on computer systems. He joined the control center staff as an engineer, eventually becoming head of the department of computer systems. For the past three years, Goncharov was a science associate in the field of space technology applications and computer systems.

His command of the English language kept him busy during the same period as a part-time interpreter. He assisted both sides in helping to bridge the language gap in planning meetings leading to the success of the Phase I Program. Many JSC employees also came to know Goncharov as a close friend

with a keen sense of humor.

A memorial service was held Wednesday in the courtyard of the MCC Moscow attended by several hundred friends and co-workers from Russia's space agency and NASA.

A Russian announcement of Goncharov' death read, "The Mission Control Center-Moscow, mournfully announces the untimely death of leading science associate of MCC-M, Boris Yakovlevich Goncharov. A very nice man passed away who was a kind and helpful friend and good family man. Goncharov worked more than 25 years at the enterprise. He became a high class specialist recognized not only in our country, but also abroad. His knowledge is shared lavishly with all his colleagues. Always rendering sincere help, he was distinguished by modesty and a sensitive attitude toward people. A good memory about Boris will stay in our hearts forever."

Goncharov is survived by his wife, Galina, two children Vasily and Vera and one grandchild. He was 49.

Columbia lands at Edwards

(Continued from Page 1)

Columbia was about 4,390 miles from the Edwards landing strip in California.

Temperatures ranged from 2,500 to 3,000 degrees Fahrenheit on some parts of the tiles. Commander Young took manual control of *Columbia* about 115,000 feet up.

Twin sonic booms announced the arrival of *Columbia* while the vehicle was still at an altitude of 54,000 feet.

About 400 feet above the desert landing gears were lowered.

Columbia landed on Runway 23 of Rogers Dry Lake at Edwards Air Force Base in the Mohave Desert rolling 8,993 feet — within 200 feet of the estimate.

Shuttle program officials and astronauts said *Columbia* exceeded performance expectations and dubbed it their "incredible flying machine."

Party features Russian dancers

(Continued from Page 1)

of the space shuttle and Southwest Airlines hot-air balloons from Howard L. Ward Park. The Russian Dance Troupe and Troika Band will play at 6:30 p.m. at the Nassau Bay Hilton, and a Russian Festival Farewell Banquet, featuring entertainment by the Eddie Adcock Band and Jack Bacon Choral Group, will begin at 7 p.m., also at the Hilton.

Tickets are on sale at the Bldg. 11 Exchange Store. A limited number of tickets will be available for purchase

at the door. Parking at SCH is free.

Admission will allow party-goers access to all exhibits and activities available at SCH, except tram tours. Snacks and soft drinks are included in the tickets, which also may be exchanged for beverage coupons. Optional food purchases can be made at the Silver Moon Cafe. Live entertainment will include a Russian Dance Troupe, Troika Band, the Lone Star Bluegrass Band and, now, the Max-Q astronaut band. For details call x35350.

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Electronic mail messages should be sent to the editor, khumphri@gp301.jsc.nasa.gov or the managing editor, kschmidt@gp301.jsc.nasa.gov.
Editor Kelly Humphries
Managing Editor Karen Schmidt

http://shuttle-mir.nasa.gov